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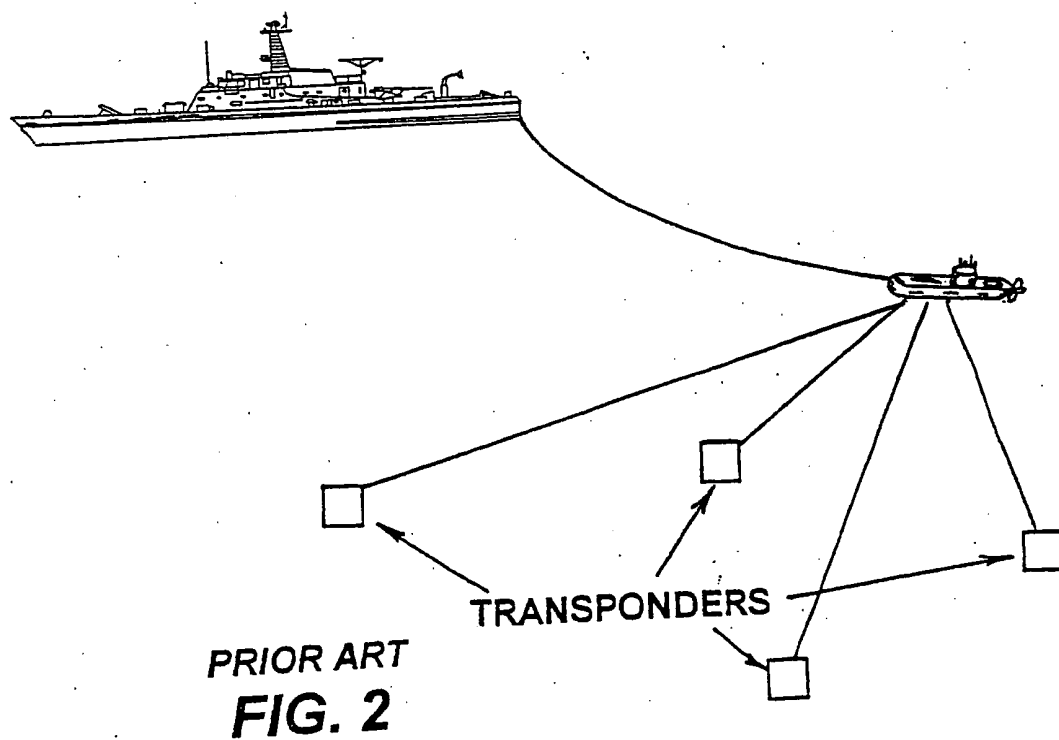
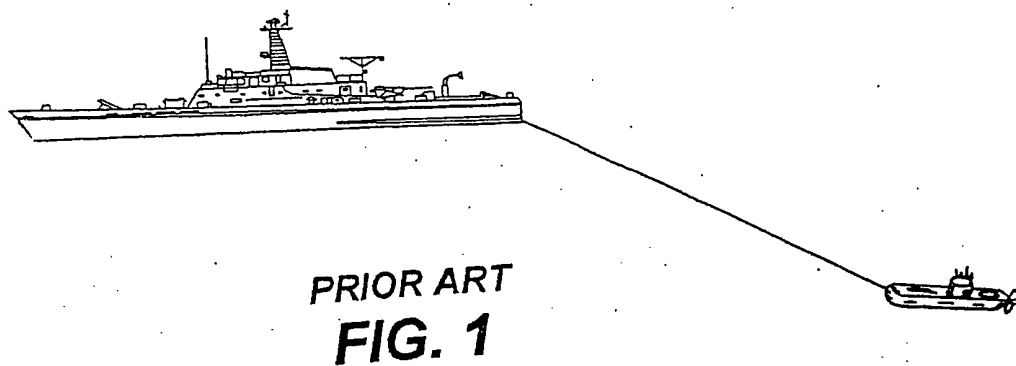
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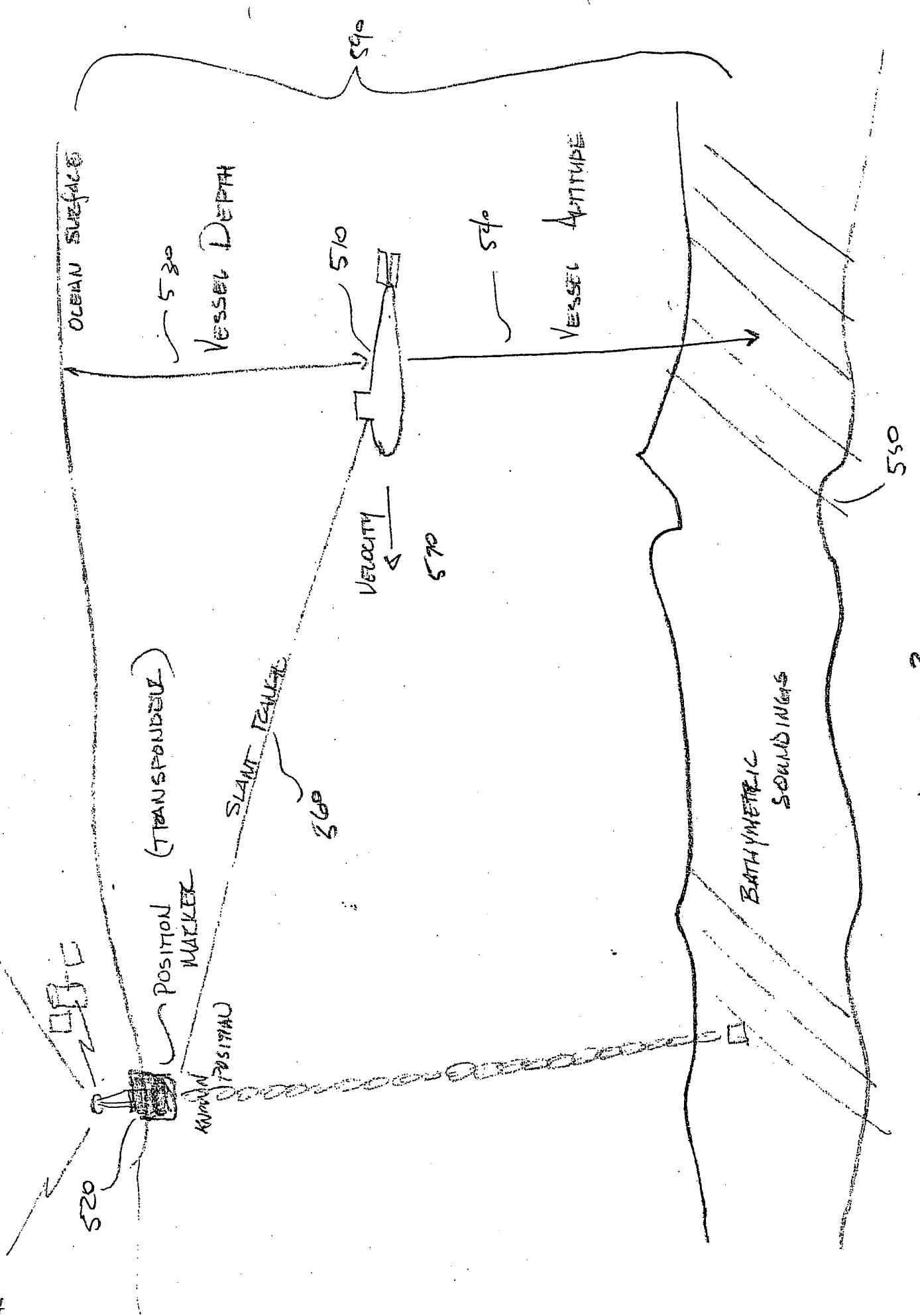
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EXAMPLE OF LOST 2 EMPLOYING MULTIPLE UUV'S

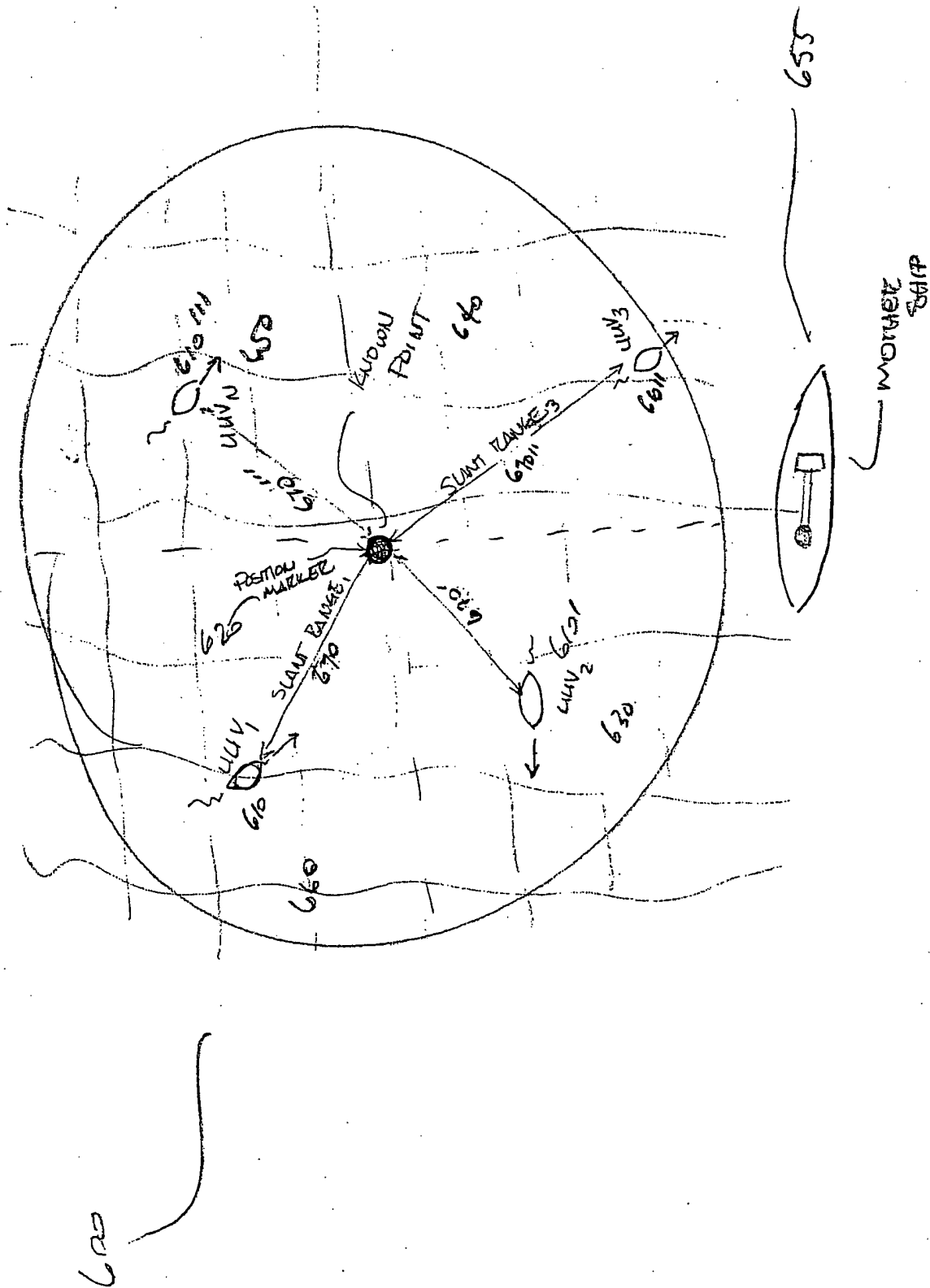
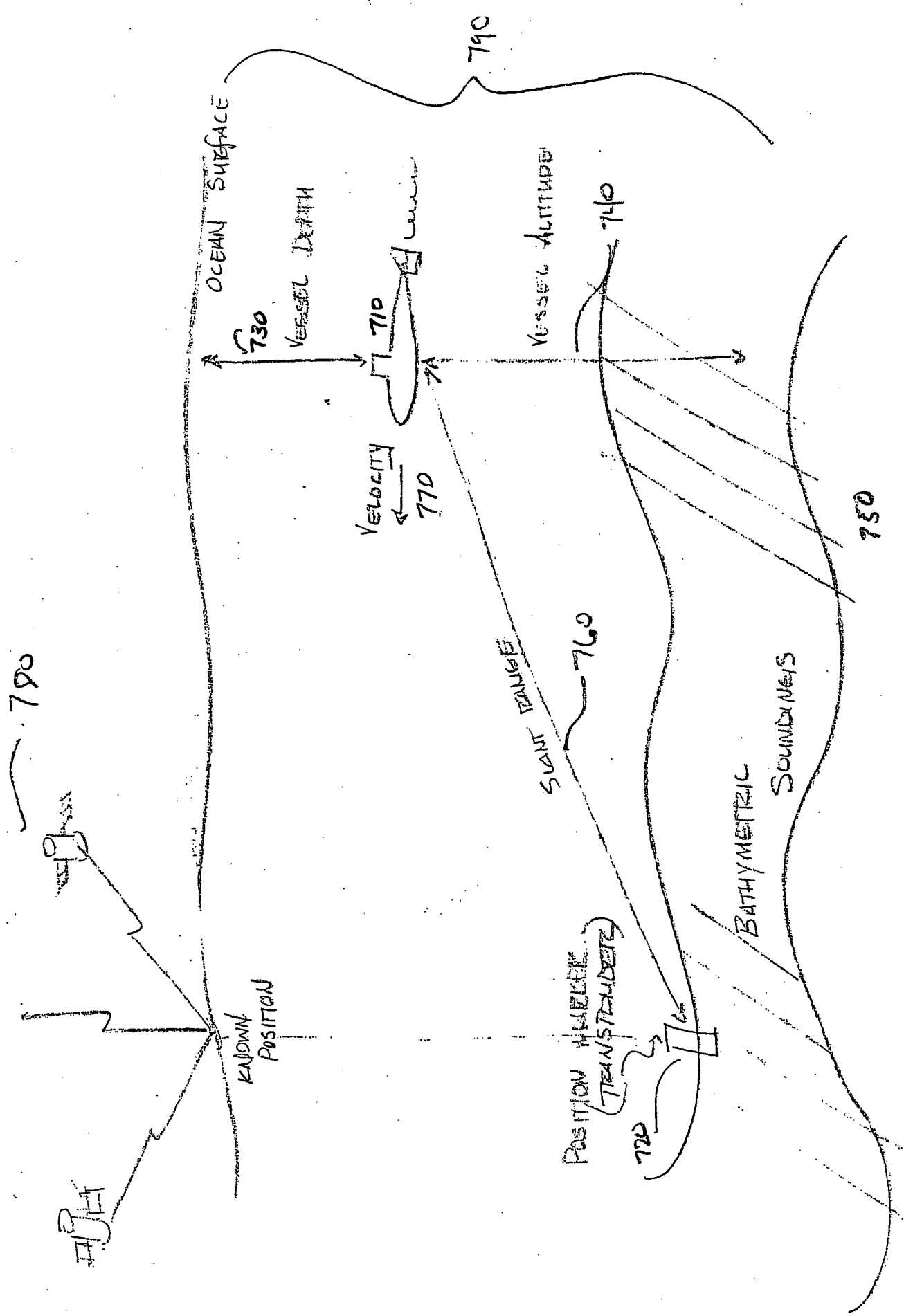
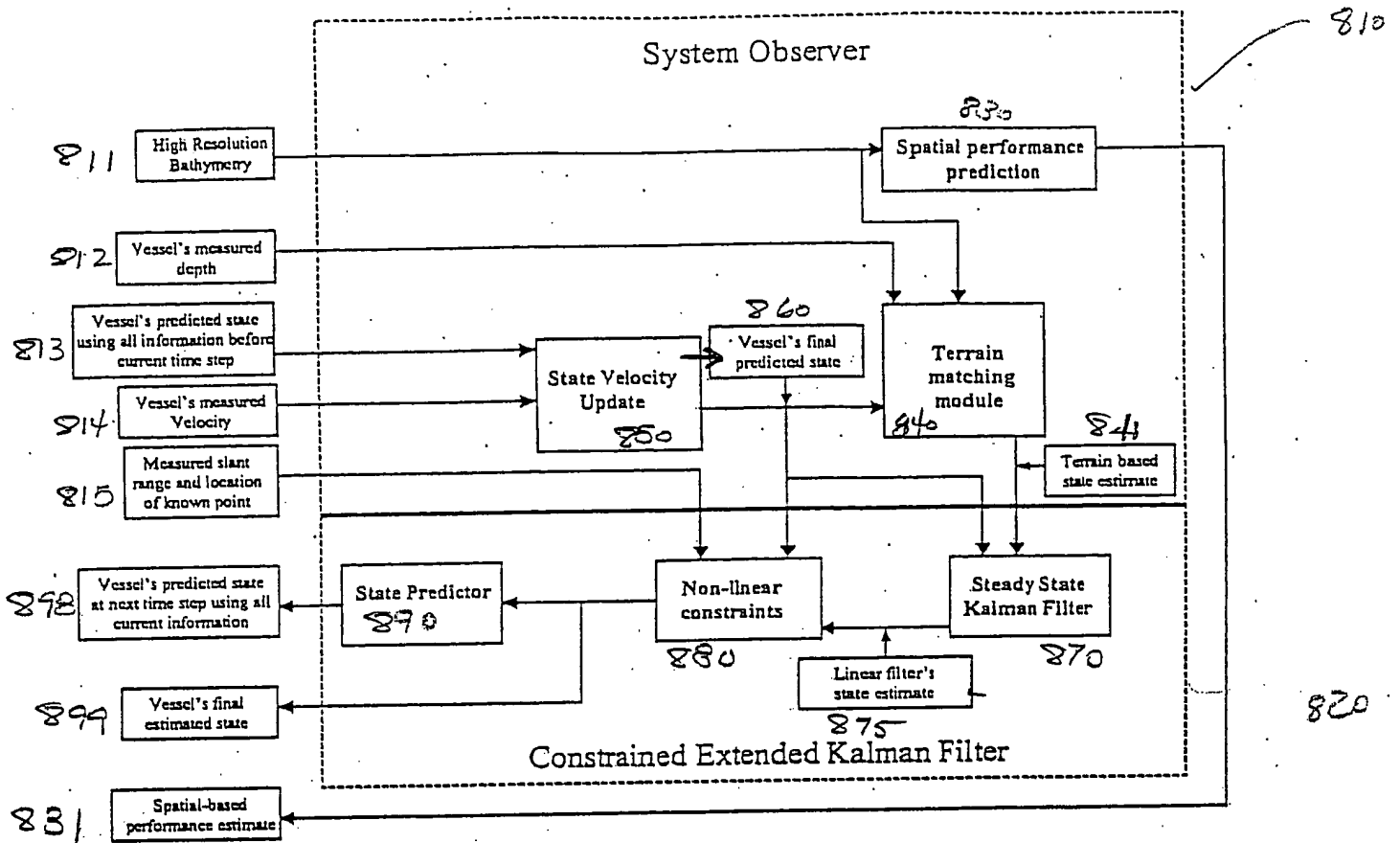


FIGURE 6



Lost - 2

FIGURE 7



Block diagram of the system showing the two primary subsystems

FIGURE 8

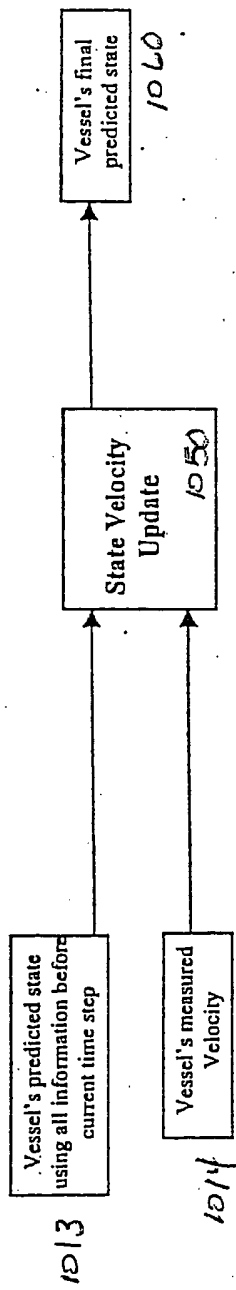
The diagram illustrates a "System Observer" (indicated by a dashed box) that processes various inputs to produce a spatial-based performance estimate. The components and their interconnections are as follows:

- Inputs:**
 - 411 High Resolution Bathymetry**: Provides input to the **930 Spatial performance prediction** block.
 - 912 Vessel's measured depth**: Provides input to the **940 Terrain matching module**.
 - 913 Vessel's predicted state using all information before current time step**: Provides input to the **950 State Velocity Update** block.
 - 914 Vessel's measured Velocity**: Provides input to the **950 State Velocity Update** block.
 - 915 Measured slant range and location of known point**: Provides input to the **941 Terrain based state estimate** block.
- Internal Processing:**
 - The **950 State Velocity Update** block receives inputs from 913 and 914, and outputs to the **960 Vessel's final predicted state** block.
 - The **940 Terrain matching module** receives inputs from 912 and 960, and outputs to the **941 Terrain based state estimate** block.
- Output:**
 - The **941 Terrain based state estimate** block receives inputs from 940 and 915, and outputs to the **931 Spatial-based performance estimate** block.
 - The **930 Spatial performance prediction** block receives input from 411 and outputs to the **931 Spatial-based performance estimate** block.
- Intermediate Step:**
 - The output of the **931 Spatial-based performance estimate** block is labeled **Passed To Filter**.

FIGURE 9

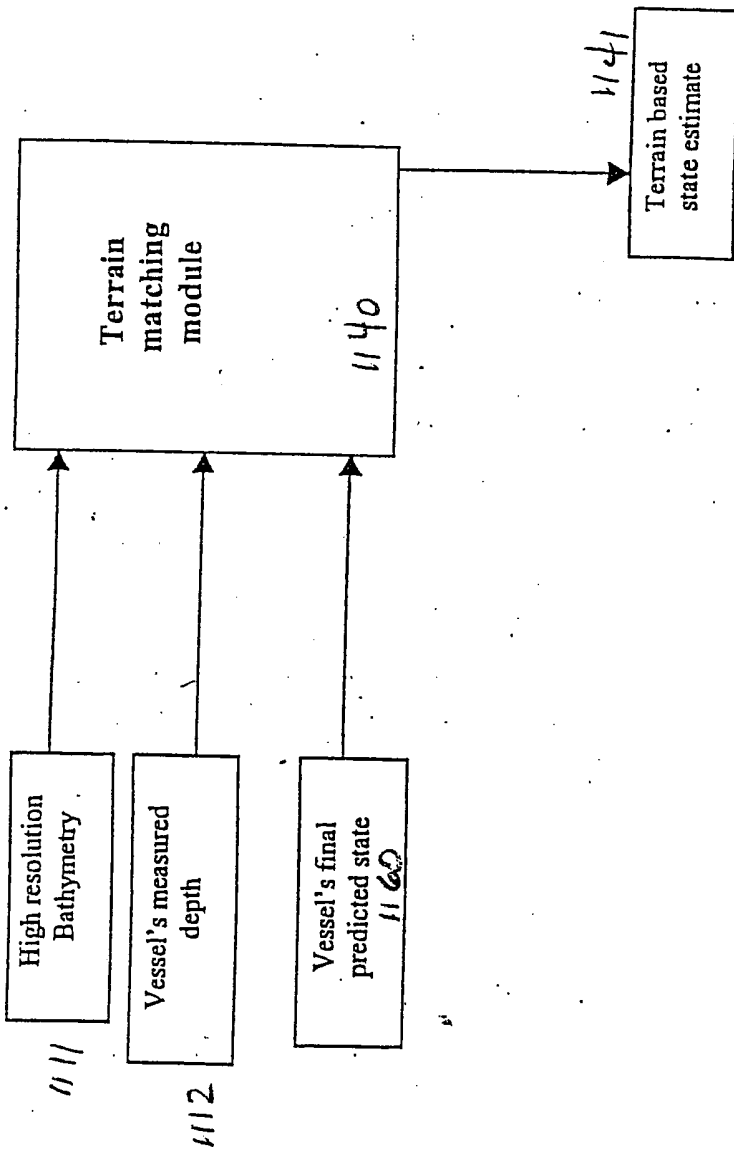
Block diagram of the system observer subsystem showing the signals

flow

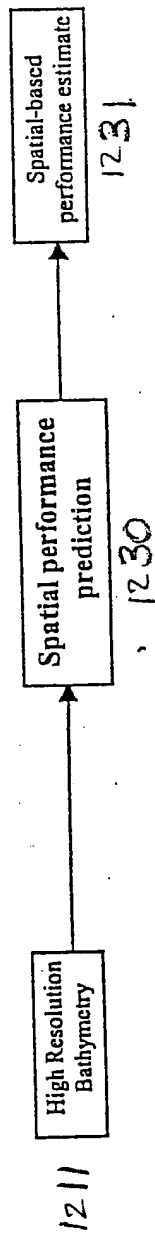


-Input/Output diagram for the state velocity update

FIGURE 10

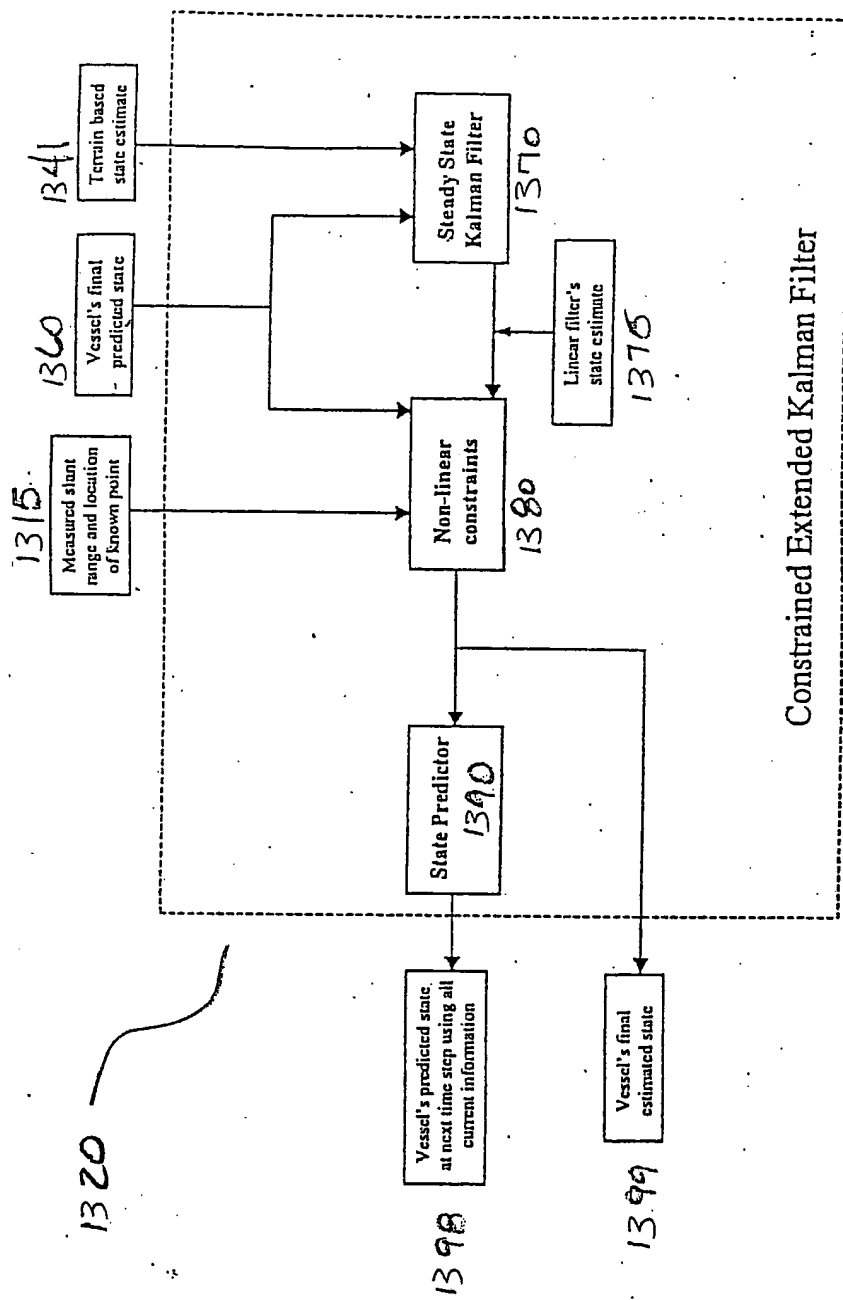


-Input/Output diagram for the terrain matching module



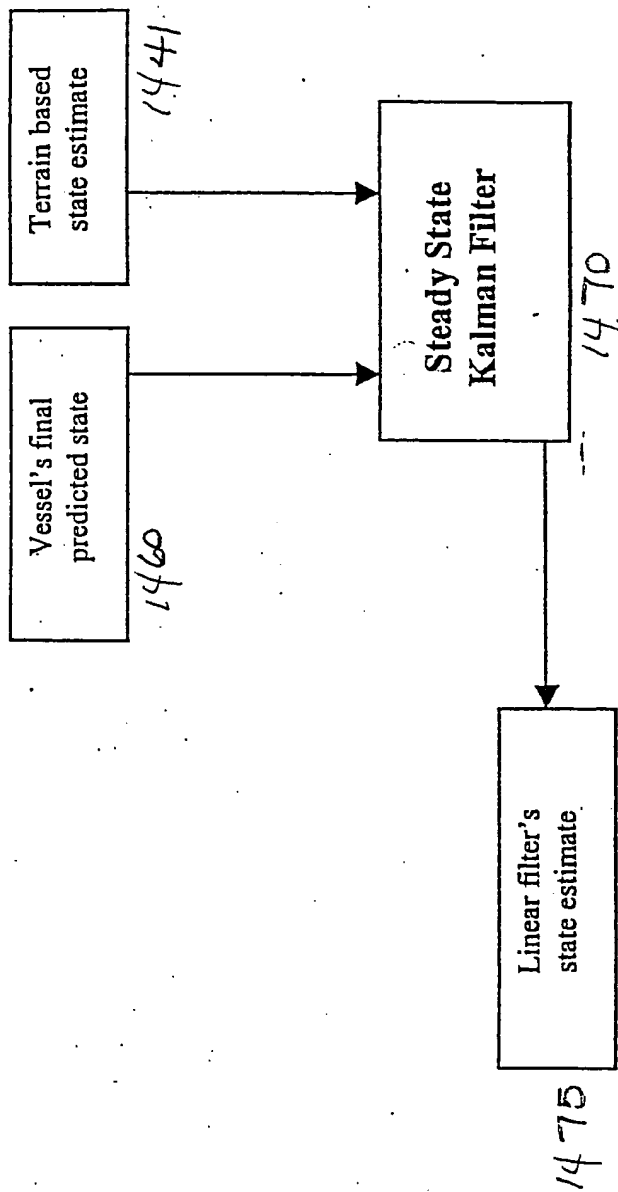
Input/Output diagram for the spatial based performance prediction module

Figure 12



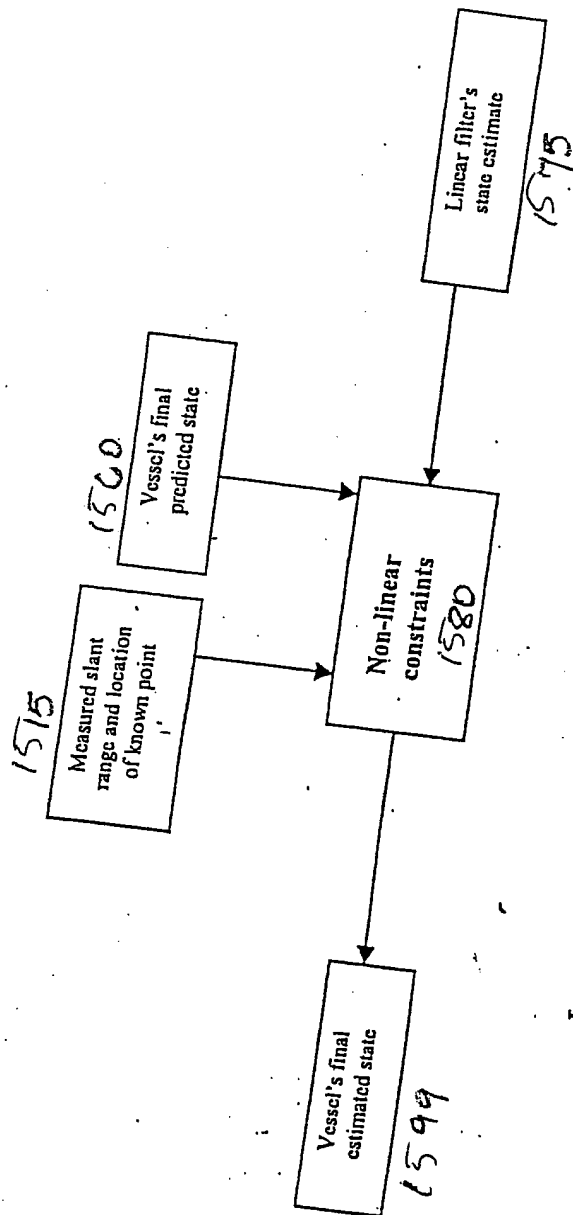
Block diagram of the constrained extended Kalman filter subsystem showing the signal flow

FIGURE 13



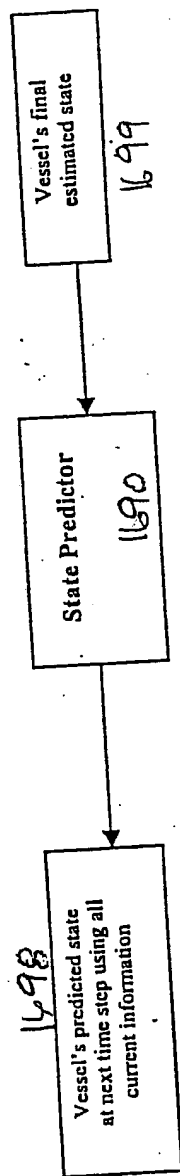
Input/Output diagram for the steady state Kalman filter

FIGURE 14



Input/Output diagram for the nonlinear constraint module

FIGURE 15



Input/Output diagram for the state predictor

FIGURE 16